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[PGD 22: Educational Instruments and Equipment]



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“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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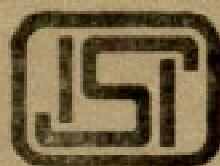
IS : 8681 - 1978

*Indian Standard*

SPECIFICATION FOR  
ENGINEERS' DRAWING INSTRUMENTS,  
COMPASS, BOW PENCIL, DOUBLE KNEE  
JOINTED WITH SECTOR HEAD JOINTS

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# Indian Standard

## SPECIFICATION FOR ENGINEERS' DRAWING INSTRUMENTS, COMPASS, BOW PENCIL, DOUBLE KNEE JOINTED WITH SECTOR HEAD JOINTS

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# *Indian Standard*

## **SPECIFICATION FOR ENGINEERS' DRAWING INSTRUMENTS, COMPASS, BOW PENCIL, DOUBLE KNEE JOINTED WITH SECTOR HEAD JOINTS**

### **0. FOREWORD**

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 18 January 1978, after the draft finalized by the Optical and Mathematical Instruments Sectional Committee had been approved by the Mechanical Engineering Division Council.

**0.2** Compass, bow pencil, double knee jointed with sector head joints comprises of two legs, one having a needle and the other having provision of carrying pencil point. The pencil point has an arrangement for holding the pencil lead. Both the legs are knee jointed in order to keep the points vertical while drawing large circles. A sector head is provided at the joint of the two legs.

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### **1. SCOPE**

**1.1** This standard covers the requirements of compass, bow pencil, double knee jointed for use in drawing offices.

### **2. NOMENCLATURE**

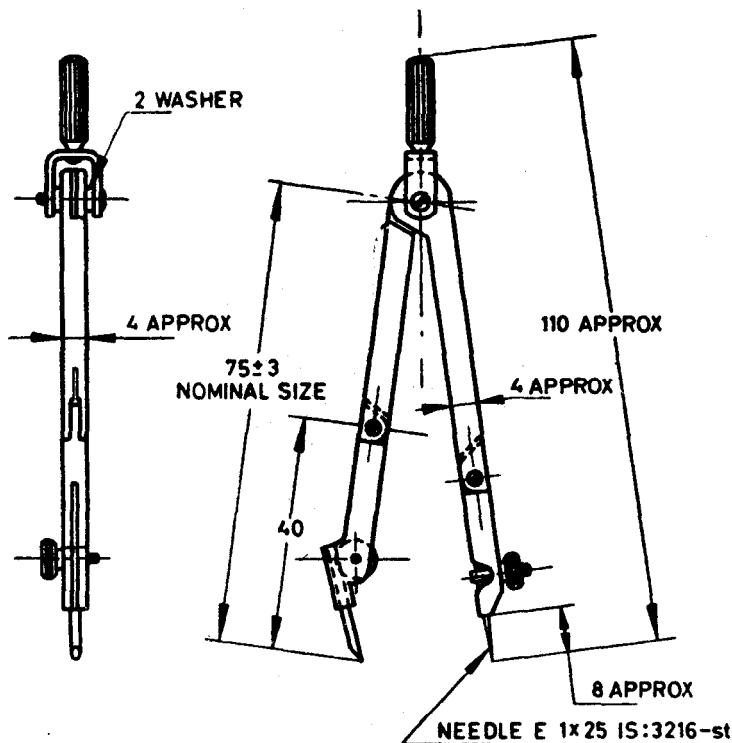
**2.1** The nomenclature of different parts of the compass is shown in Fig. 1.

### **3. MATERIAL**

**3.1** The material used for the manufacture of the compass body shall be rolled, drawn or cast brass, nickel, silver or stainless steel.

### **4. DIMENSIONS**

**4.1** The dimensions for compass shall be as shown in Fig. 1. The design details shall be at the discretion of the manufacturer as long as the requirements stipulated in this standard are complied with.



All dimensions in millimetres.

FIG. 1 NOMENCLATURE AND DIMENSIONS FOR COMPASS, BOW PENCIL, DOUBLE KNEE JOINTED WITH SECTOR HEAD JOINTS

## 5. GENERAL REQUIREMENTS

**5.1** The joints shall be perfectly true and shall work smoothly without shake in any position. These shall be sufficiently friction tight so as to remain rigid when set at any angle and shall be entirely free from side play.

**5.2** The compass shall be provided with a suitable arrangement for tightening the joints when they become loose.



**5.3** The slit shall be true, smooth in the centre of the leg and parallel to the sides of the socket. The socket shall be slightly wider at the upper end and when closed on the pencil lead shall hold it firmly throughout the entire length of the socket. The socket shall be perfectly straight so as not to have any tendency to break the pencil lead.

**5.4** The pencil socket shall be of such interior diameter that an ordinary pencil lead of 2 mm in diameter may be tightly clamped. The slit in the socket shall be continued through the pencil leg to make the entire length of the slit not less than 20 mm.

**5.5** A pencil lead of suitable length and sharpened to a chisel point shall be supplied and fitted in the socket.

**5.6** The needle shall conform to type 'E' of IS : 3216-1965\*. The diameter of the needle shall be 1 mm.

**5.7** The pencil points shall conform to IS : 3214-1965†.

**5.8** Different screws used in the compass shall conform to IS : 3222 ( Part I )-1966‡.

**5.9** The needle point leg of the compass shall be recessed for a length of 20 mm to take the needle.

## **6. WORKMANSHIP AND FINISH**

**6.1** All engravings shall be correctly filled in with thoroughly adherent filling material.

**6.2** All painted surfaces shall be such as to form a thoroughly adherent continuous film, free from breaks, runs or thin patches.

**6.3** The needles shall be hardened, tempered, ground and polished bright.

**6.4** Nickel silver and steel components shall be polished and buffed.

**6.5** All brass components shall be chromium plated to Grade B of IS : 1068-1968§.

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\*Specification for engineers' drawing instruments, needles.

†Specification for engineers' drawing instruments, pencil points.

‡Specification for instrument screws; Part I Fasteners for drawing instruments.

§Specification for electroplated coatings of nickel and chromium on iron and steel ( first revision ).

## **7. TESTS**

**7.1 Performance Test** — The compass shall be tested for smooth functioning. It shall open and close smoothly without jerk. A suitable apparatus may be used to close and open the two legs and the force required for this purpose shall be 3 to 4 newtons. The compass shall be opened and closed for 1 000 operations. The reduction in force for opening and closing the compass shall not exceed the limits given below:

For 500 operations	50 percent, <i>Max</i>
For 1 000 operations	75 percent, <i>Max</i>

After 1 000 operations the main joints shall be reset and tested for a further 1 000 operations. In the reset the reduction in force shall not exceed the limits specified for the original setting.

**7.1.1** The performance test is a destructive test and shall be conducted according to the sampling plan previously agreed to between the purchaser and the manufacturer.

**7.2** The pencil point shall be tested for satisfactory holding of pencil lead.

**7.3** The needle point shall be tested for convenience in fixing and removing the needles.

## **8. MARKING**

**8.1** Each compass shall be legibly and indelibly marked with the name, initials or trade-mark of the manufacturer at a suitable place on the body.

**8.1.1** Each compass may also be marked with the ISI Certification Mark.

**NOTE** — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

## **9. PACKING**

**9.1** Compass, bow pencil, double knee jointed, when supplied separately shall be wrapped in a tissue paper which shall be retained in position with cellophane tape. The package shall be placed in a suitable carton. The manufacturer's name or trade-mark shall be printed on the cartons.

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